CLAIMS

1. A method for mounting a light emitting element by suctioning a first part serving as a light emitting element having an optic axis toward the horizontal direction at the lower end portion of a suction head, and mounting this first part while aligning this with a second part held on a stage, the method comprising:

a process for preparing:

a first optical system disposed further above than said suction head;

a second optical system disposed further below than said stage such that the optic axis thereof and the first optical system are generally faced; and

a third optical system disposed such that the optic axis thereof and the first optical system are generally orthogonalized;

a process for inserting the suction head between the first optical system and the second optical system, capturing a head reference mark, which is appended to the suction head and can be recognized from above, using the first optical system, capturing the first part suctioned at the suction head using the second optical system, also making the first part emit light, and recognizing the optic axis thereof using the third optical system;

a process for inserting a stage between the first

optical system and the second optical system, capturing the second part held on the stage using the first optical system, and also capturing a stage reference mark, which is appended to the stage and can be recognized from below, using the second optical system;

a process for calculating the relative position between the first part and the suction head using the image information from said first optical system, second optical system, and third optical system, and the relative position between the second part and the stage;

a process for recognizing said head reference mark and stage reference mark using said first and second optical systems in a state in which said suction head and stage are moved to a mounting position, subjecting at least one of the suction head and the stage to position correction using those position information and said relative position information such that the positions of the first part and the second part serve as a predetermined relation; and

a process for mounting the first part and the second part following said position correction.

2. The method for mounting a light emitting element according to Claim 1, wherein said process for preparing the first optical system and the second optical system includes a process for measuring the amount of optic-axis deviation

between the first optical system and the second optical system by inserting a single calibration mark, which can be recognized from both above and below, between the first optical system and the second optical system, and capturing this calibration mark using the first optical system and the second optical system.

3. The method for mounting a light emitting element according to Claim 1, wherein said process for preparing the first optical system and the third optical system includes a process for measuring the amount of optic-axis deviation between the first optical system and the third optical system by inserting a calibration mark of which the relative spatial relationships from above and from the horizontal direction are known between the first optical system and the third optical system, and capturing this calibration mark using the first optical system and the third optical system.

4. The method for mounting a light emitting element according to Claim 2 or 3, wherein said calibration mark is a mark provided on said suction head or stage.

5. The method for mounting a light emitting element according to any one of Claims 1 through 4, wherein with said process for making the first part emit light, and

recognizing the optic axis thereof using the third optical system, the emitting light state of the first part is measured, and the first part is discharged as a defective article without proceeding to the subsequent processing, in the event that the emitting light state thereof deviates from the reference value.

6. The method for mounting a light emitting element according to any one of Claims 1 through 5, wherein said first optical system, second optical system, and third optical system are held at fixed spatial relationships throughout the process for capturing said head reference mark and first part, the process for capturing said second part and stage reference mark, the process for subjecting at least one of said suction head and stage to position correction, and the process for mounting the first part and the second part.

7. The method for mounting a light emitting element according to any one of Claims 1 through 6, wherein said position correction process between the suction head and the stage at the mounting position including:

a process for recognizing said head reference mark and stage reference mark using said first, second optical systems, and subjecting the suction head and the stage to

temporal tacking using said relative position information such that the positions of the first part and the second part serve as a predetermined relation; and

a process for consecutively capturing the head reference mark and the stage reference mark using the first and second optical systems while heating one of or both said suction head and stage for bonding, and subjecting the suction head and the stage to relative position correction so as to maintain the relative spatial relationships of said temporal tacking process.

8. The method for mounting a light emitting element according to any one of Claims 1 through 7, wherein said process for mounting the first part and the second part measures the relative distance in the vertical direction between the first part and the second part using the third optical system, and mounts the first part and the second part while correcting the bonding gap thereof.

9. A device for mounting a light emitting element by mounting a first part serving as a light emitting element having an optic axis toward the horizontal direction while aligning this with a second part, the device comprising:

a suction head for suctioning the first part at the lower end portion thereof, and having a head reference mark

which can be recognized from above;

a stage for holding the second part at the upper end portion thereof, and having a stage reference mark which can be recognized from below;

a driving mechanism for relatively moving said suction head and stage in the X, Y, and θ directions;

a first optical system, which is disposed further above than said suction head, for capturing the second part held on the stage and the head reference mark;

a second optical system, which is disposed further below than said stage so as to generally face the optic axis of the first optical system, for capturing the first part suctioned at the suction head and the stage reference mark;

a third optical system, which is disposed such that the direction of the optic axis thereof is generally orthogonal as to the first optical system, for capturing the optic axis at the time of making the first part emit light;

a calculating device for calculating the relative position between the first part and the suction head, and the relative position between the second part and the stage using the image information from said first through third optical systems;

a control device for recognizing said head reference mark and stage reference mark using said first and second optical systems in a state in which said suction head and

stage are moved to a mounting position, subjecting the suction head and the stage to position correction using those position information and said relative position information such that the positions of the first part and the second part serve as a predetermined relation.

10. The device for mounting a light emitting element according to Claim 9, wherein at least one of said suction head and stage comprising:

a part suction hole;

a hollow portion which is provided behind said suction hole, and communicates the part suction hole;

a transparent body which shuts down the face thereof facing the part suction hole of said hollow portion, and can see through the part suction hole from behind;

an air suctioning path connected to said hollow portion; and

a heater for heating which is fixed near said part suction hole;

wherein the part suction hole can be recognized through said transparent body as a head reference mark or stage reference mark.

11. The device for mounting a light emitting element according to Claim 10, wherein said suction head or stage is

attached to said driving mechanism via a bracket;

and wherein a cavernous portion into which the first or second optical system can be inserted for capturing the part suction hole via said transparent body is formed in said bracket.

12. The device for mounting a light emitting element according to any one of Claims 9 through 11, further comprising a power source unit for making said first part emit light when recognizing the optic axis of the first part using said third optical system.

13. The device for mounting a light emitting element according to any one of Claims 9 through 12, wherein said third optical system captures the first part and the second part, or the suction head and stage from the side;

wherein said calculation device calculates the relative distance in the vertical direction between the first part and the second part using the image information from the third optical system; and

wherein said control device corrects the bonding gap between the first part and the second part based on said relative distance information.